

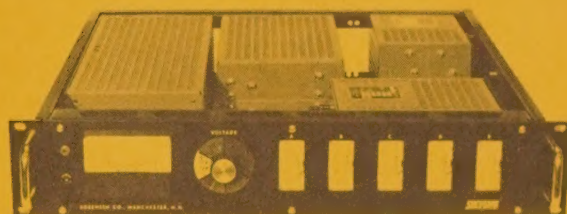
Sorensen POWER SUPPLIES

GENERAL MANUAL for

MULTI-OUTPUT RACK SYSTEMS and Accessories



5" METERED RACK



3" METERED RACK

Features

- Up to 850 Watts in 3½"
- Up to 1400 Watts in 5½"
- Up to 16 Outputs per Rack
- Six Rack Sizes
- Broad Selection of Options
- Unlimited Combinations

GENERAL ELECTRIC
INSTRUMENTATION & COMMUNICATION
1200 KONA DRIVE
COMPTON, CA 90220
(213) 642-5317

SORENSEN COMPANY

A UNIT OF RAYTHEON COMPANY

676 ISLAND POND ROAD MANCHESTER, NEW HAMPSHIRE 03103

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WARRANTY

Sorensen Company warrants all parts of equipment of its manufacture, except special purpose tubes and semi-conductor devices which carry their own manufacturer's warranty, to be free from defects caused by faulty material or poor workmanship. Sorensen Company warrants its products to conform to applicable commercial or military specifications when confirmed on the Order Acknowledgment form to be free from defects caused by faulty material or poor workmanship. Sorensen Company's obligation is limited under the warranty to repair or replacement of products in kind, or at its sole option to issuance of a credit of original purchase price. Returns must be accompanied by a Sorensen Company Return Authorization form and conform to standard conditions for adjustment. The aforesaid warranty shall expire twelve (12) months following the last day of the month of shipment from Sorensen Company's plant. The foregoing states the entire warranty extended by Sorensen Company. No other warranty, expressed or implied, is made and, specifically, Sorensen Company makes no warranty of merchantability or fitness for any purpose. In no case shall Sorensen Company be liable for any special or consequential damages. Authorization must be obtained prior to return of defective items.

SORENSEN COMPANY

INTRODUCTION

Industrial demand for modular power supplies continues to grow as newer, faster, and more efficient electronic systems are developed. Sorensen Company has kept pace with the development of the medium-power QSA and PTM series, and most recently, the higher power (to 700 watts) STM switching-transistor series.

Sorensen's power-supply rack adapters provide multiple power output capability in a conveniently small space. Typical applications group several modular supplies, with individual current meter readouts, in a compact, custom-designed rack assembly. These supplies combine exceptional power density and high output efficiency with the convenience of rack mounting.

This systems manual supplements general rack applications data with photos, interconnection drawings, wiring diagrams, schematics and parts lists. Sufficient data is provided to enable the user to design and fabricate custom rack-mount systems. Mounting dimensions for modular power supplies are detailed in the individual instruction manuals.

At the end of the manual are representations of currently available Sorensen modular power supplies. Included are module size designations and overall dimensions. This data can be used to determine space requirements in a particular rack assembly.

The "Requirements Assessment Aid" sheet may be used to summarize system requirements if factory assistance is required. For additional information, return mailer card included at the back of the manual, or contact:

Sorensen Company
676 Island Pond Road
Manchester, N. H. 03103

Attn: Marketing Dept.

Tel: (603)668-4500
TWX: 710-220-1339

SORENSEN RACK SYSTEMS

Sorensen rack assemblies (Figure 1) offer a standard 19-inch width, two heights, three depths, and are supplied with or without slide adapters, and with or without metering.

Any of Sorensen's modular power supplies may be inserted into single or multiple-output rack systems. These modulars include the high-efficiency STM series (40 models), the PTM's (singles and duals), the high-performance QSA series, and the encapsulated MMS, MMD, CMS, and CMD series.

Two basic metering schemes are available:

The first consists of quarter-rack meter panels complete with volt-ammeter, monitoring binding posts and fuse holders (Figure 2). These panels may be used with the PTM and QSA series. Panels may be shipped separately or installed in AC-300 or AC-500 racks at the factory.

The second metering system consists of full-rack metering panels (Figure 3) for all products in Sorensen's modular line. The panels are available with a single, selectable-scale voltmeter and up to five current-monitoring meters. These panels are factory-calibrated and are not designed for field installation.

Table 1

Sorensen Power-Supply
Module Sizes
(See Page 13)

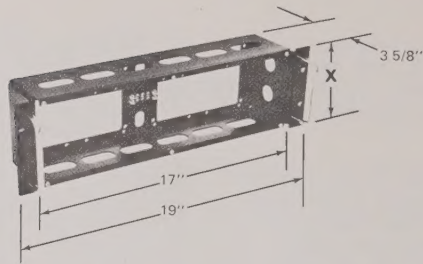
Module	Height"	Width"	Depth"
I	3-5/16	3-7/8	6-1/2
II	3-5/16	5-1/8	6-1/2
III	3-5/16	5-1/8	9-1/2
IIIA	3-5/16	5-1/8	14
IIIB	5-1/8	5-1/8	9-1/2
IVA	4-15/16	7-1/2	10-1/2
VI	4-15/16	7-1/2	14

Table 2-AC Input Wiring

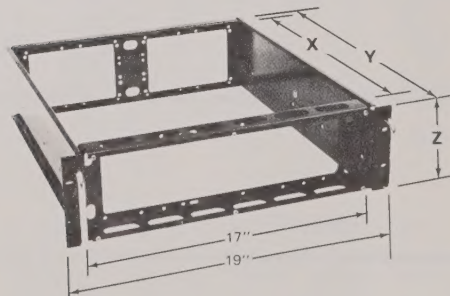
Module Series	TB1-1 Blk to Terminal: (AC High)	TB1-2 White to Terminal: (AC Low/Neutral)	TB1-3 Green to Terminal: (Chassis Grd)
QSA I, II, III (7-Terminal)	6*	7	5
PTM (A11)	6	7	5
STM (A11)	7	6	5

*If VP (overvoltage protector) is used, a-c line fuse (ref. QSA instruction manual) is wired in series with the black lead and this terminal.

RACK ADAPTERS



Model	X"	AC Input Terminal
AC 300	3-1/2	Inside chassis at right edge
AC 500	5-1/4	Inside chassis at center



Model	X"	Y"	Z"	Sorensen # Chassis Slide	AC Input Terminal
AC 318	15	18	3-1/2	587552-1	At rear, left edge
AC 320	17-1/2	20	3-1/2	587552-2	
AC 518	15	18	5-1/4	587552-1	At rear, center
AC 520	17-1/2	20	5-1/4	587552-2	

Figure 1
300/500 Series
Rack-Adapter Dimensions

METER PANELS

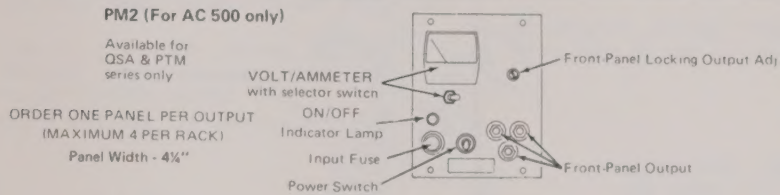
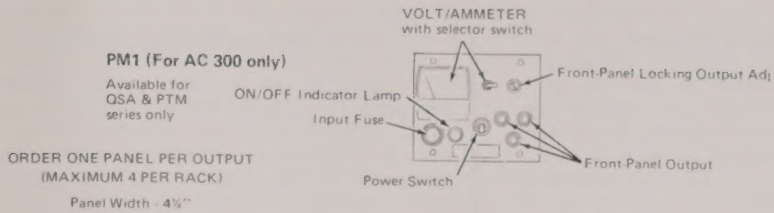


Figure 2
PM1/PM2 Meter Panels

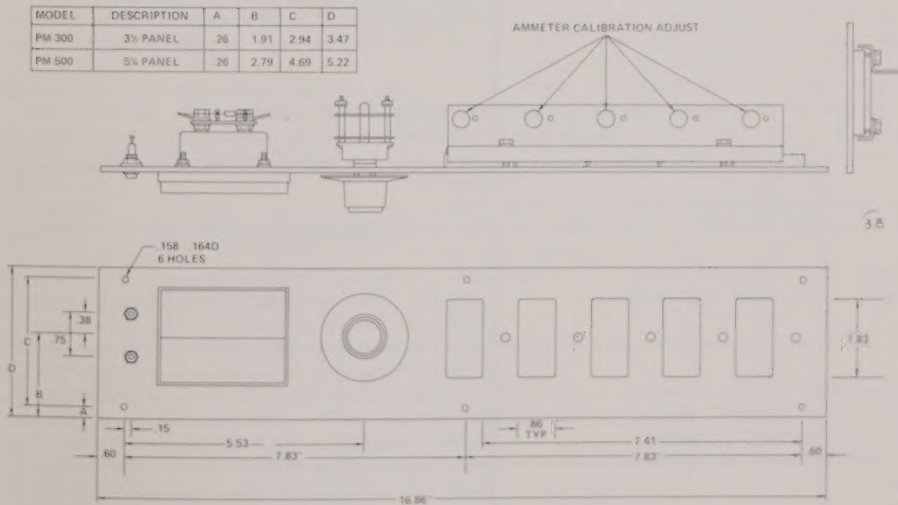


Figure 3
PM300/PM500 Front-Panel Assembly

RACK ASSEMBLY DESCRIPTION

1. AC 300/500 Rack Assemblies (Figure 1)

The AC 300 and AC 500 comprise the "short" (3-5/8") depth series of Sorensen rack assemblies, differing only in height. The rack a-c input terminal strip (TB1) is factory-wired to each module in the assembly (Table 2) and it is only necessary to attach a line cord or other input wiring to this terminal strip. Power-supply d-c outputs are available at the individual module terminal strip.

Any of the Sorensen meter panels; PM1/PM2 (Figure 2) or PM300/PM500 (Figure 3), may be used with the "short" racks.

NOTE

When mounting module size I units (Table 1) on the AC500 rack, two mounting brackets (Sorensen part number 73-2747) must be ordered separately.

2. AC 318/320/518/520 Rack Assemblies

These rack models comprise the standard series of Sorensen rack assemblies, with heights of 3-1/2 and 5-1/4 inches, and depths of 18 and 20 inches (Figure 1). All a-c inputs are factory-wired (Table 2) and terminate at TB1 on the rear chassis. D-C output wiring (customer-installed) should also be connected at the module terminal board. When the assembly contains modules mounted at the rear (the most common configuration), connection to the module terminal strip is relatively straightforward. When modules have been mounted at the front of the rack, cabling must be installed from the output terminal strip of each unit to the chassis rear panel.

Sorensen meter panels PM300/500 (Figure 3) are designed for specific rack assemblies:

PM300; Used in AC 318/320 racks
PM500; Used in AC 518/520 racks

NOTE

When mounting module size I units (Table 1) on the AC518/520 racks, two mounting brackets (Sorensen part no. 73-2747) must be ordered separately.

3. Panel Meters PM1/PM2 (Figure 2)

PM1/PM2 series panel meter assemblies are designed for use in the AC300 (3½"H) and AC500 (5¼"H) racks respectively, and are mounted at the front of the rack assembly. The panel wiring harnesses are connected to the associated power-supply module, normally mounted directly behind the meter panel assembly.

Applications for the PM1/PM2 meter panels are limited to the following power supplies:

A. QSA series, modules I, II or III (see Figure 5 for wiring connections).

B. PTM series, all modules (Figure 5).

NOTE

Internal wiring of PM1/PM2 panels corresponding to specific modules is shown schematically in Figures 7A/B/C at the end of the manual.

When PM1/PM2 panels are installed, unit output power from each module is available at the two front-panel binding posts. If desired, the user may bring the dc output to the rear of the rack by connecting cabling to the rear of the binding posts.

The module sense leads terminate at the panel binding posts. For remote sensing, the user should remove the sense leads from the binding posts. External cabling may then be connected to these sensing leads.

4. PM300/PM500 Meter Panels (Figure 3)

PM300/PM500 meter panels are designed for use in all Sorensen rack assemblies, 3½-and 5¼-inch heights respectively, (Figure 1) and are mounted at the front of the chassis (see cover photos). Up to five output current meters are available, each prewired at the factory to a specific module (Figures 6A, B). Voltage-selector switch S101 on the front panel selects the power-supply output to be monitored. The selected output appears on multi-range panel meter M1 (see Table 3), and at voltage-monitoring jacks E101/E102 on the front panel. These jacks are internally connected to the "sense" terminals of each module. In the PM300/500

meter panels, the ammeter requires a shunt connected between the module positive output terminal and the load. At the load end is a support terminal (Figure 4) which serves as the positive output load connector. The negative load lead is connected directly to the module terminal board.

As shown in the figure, the module positive sense lead is jumpered directly to the support terminal. The negative sense connection remains at the module terminal board. For remote-sensing applica-

tions, the sense jumper must be removed from the support terminal, and the positive sense lead connected to the sense terminal at the module.

Dual-output supplies (such as the PTM Dual series) are provided with a separate ammeter for each output (positive and negative). Each output contains a shunt and support terminal, serving as positive/negative output load connector as noted previously. The common output connection remains at the module terminal board.

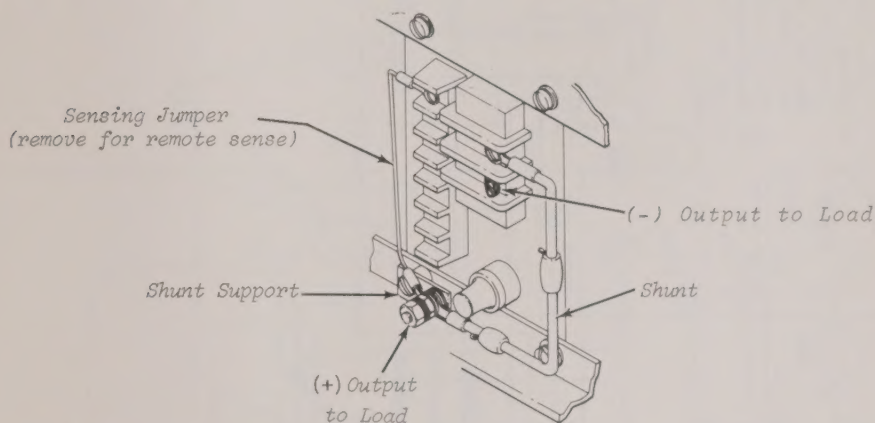


Figure 4
Typical Output Connections
PM300/500 Racks

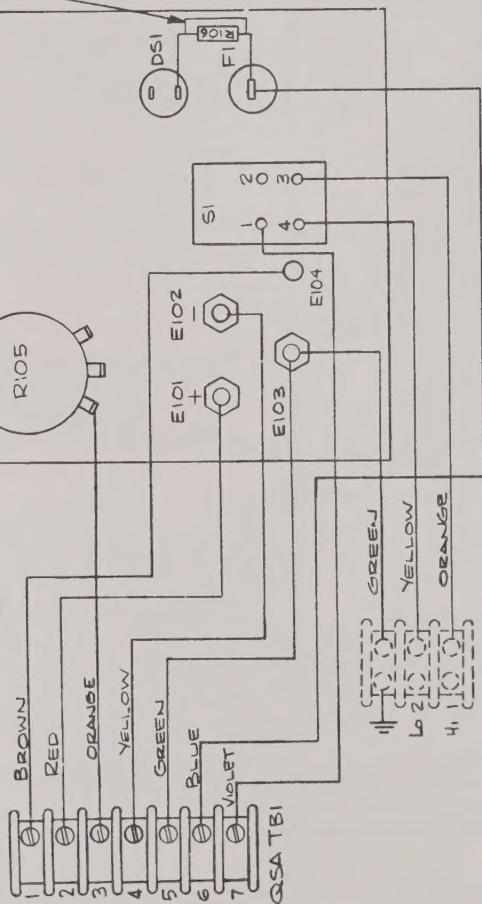
Table 3 PM300/PM500 Panel Voltmeter Ranges
(Ref. Figures 6A, B)

Module Series	Output Rating	Select VM Range:
QSA (A11)	5, 10, 12V	15V
QSA (A11)	15V, 18V	30V
QSA I, II, III (7-Term)	28V	60V
QSA (A11)	48V	60V
PTM (A11)	3, 5, 12V	15V
PTM (A11)	15, 24, 28V	30V
PTM Dual	5/12, 12/12V	15V
PTM Dual	15/15V	30V
STM (A11)	3.5, 5, 9, 12V	15V
STM (A11)	15, 18, 24, 28V	30V
STM (A11)	36, 48V	60V

PANEL WIRING DIAGRAMS

REAR VIEW TYPICAL METER PANEL PM1 & PM2

JUMPER FOR 115V
INPUT REMOVE FOR
220/230V INPUT



USE EXISTING HOLES ON
RACK ADAPTER FOR TERMINAL
BOARD OR CONNECT DIRECT

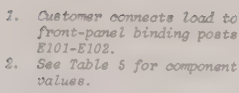
WIRING METER PANEL PM1
OR PM2 TO QSA MODELS:

5-6.4	18-1.1	48-1.8
10-1.4	18-1.9	48-1.2
10-2.2	18-3.0	75-.5
10-3.7	28-.7	75-.8
12-1.3	28-1.3	120-.5
12-2.2	28-2.0	175-.25
12-3.8	48-.4	265-.15

NOTES:

- 1) SET OUTPUT VOLT ADJUST CONTROL IN
POWER SUPPLY TO ZERO (CLOCKWISE)
- 2) REMOVE SENSING LINKS BETWEEN
TERMINALS 1-2 & 3-4

Figure 5
PM1/PM2 Installation Diagram
FTM and QSA Modules



REPLACEABLE PARTS LISTS

Tables 4 through 7 summarize the replaceable electrical parts for the PM1 (3-1/2"), PM2 (5-1/4"), and the PM300/500 series rack-adaptor meter panels. Use the Sorensen part number when ordering parts directly from:

Sorensen Company
Distribution Center
25 Industrial Road
Grenier Industrial Village
Londonderry, N. H. 03063

Table 4-Replaceable Parts - PM1/PM2 (QSA Models)
(Ref. Figure 7A)

<u>Circuit Symbol</u>	<u>Item Description</u>	<u>Sorensen Part No.</u>
DS1	Pilot Lamp	43-353
F1 (Line Fuse)	3/4A	42-404
	1A	42-880
	1.5A	42-407
	2A	42-408
	2.5A	42-1850
	4A	42-847
	5A	42-413
	6A	42-415
M1 (Volts/Amperes, Dual)	<u>Range (V/A)</u>	
	10/10	94-823-23
	10/20	94-823-24
	10/25	94-823-25
	15/3	94-823-4
	15/6	94-823-9
	20/2	94-823-10
	20/4	94-823-8
	20/8	94-823-11
	20/20	94-823-26
	30/1.5	94-823-3
	30/3	94-823-12
	30/6	94-823-13
	30/15	94-823-27
	40/1	94-823-14
	40/2	94-823-7
	40/4	94-823-15
	40/8	94-823-28
	40/20	94-823-29
	80/.8	94-823-16
	80/2	94-823-17
	150/1.5	94-823-19
	200/.8	94-823-20
	250/.5	94-823-21
	400/.2	94-823-22

(Cont'd)

Table 4-Replaceable Parts - PM1/PM2 (QSA Models) (cont'd)
(Ref. Figure 7A)

<u>Circuit</u> <u>Symbol</u>			<u>Sorensen</u> <u>Part No.</u>
R101 (Meter Shunt)	<u>Value (ohms)</u>	<u>Meter Range (A)</u>	
	1.0	0.2, 0.5	28-1253
	0.24	0.8, 1.0, 1.5	28-1252
	0.100	2	190-3960
	0.063	3	190-3959
	0.050	4	190-3958
	0.032	6	190-3957
	0.020	10	190-3955
	0.013	15	190-3954
	0.008	20, 25	190-3953
R102 (Meter Res.)	68	1.0	27-160
	300	0.5	27-1187
	180	1.5	27-190
R103 (Ammeter Cal.)	200, (Variable)		29-524
R104 (VM Multiplier)		<u>Meter Range (V)</u>	
	10K	10	28-1349
	15K	15	28-1260
	20K	20	28-1350
	30.1K	30	28-1262
	40.2K	40	28-1263
	80.6K	80	28-1351
	150K	150	28-1264
	200K	200	28-1352
	249K	250	28-1353
	402K	400	28-1354
R105 (Voltage Adjust)		<u>Model</u>	
	5V	5V	29-558
	10V	10V	29-559
	12V	12V	29-560
	18V	18V	29-561
	28V	28V	29-562
	48V	48V	29-563
	75V	75V	29-564
	120V	120V	29-565
	175V	175V	29-566
	265V	265V	29-567
R106 (Pilot Lamp Resistor)			27-168
S1 (AC Line Switch)	P.S.T., 10A, 250V/15A, 125V		45-112
S2 (Volt/Amps Selector)	P.D.T., 5A, 115V		45-165

Table 5-Replaceable Parts - PM1/PM2 (PTM Models)
(Ref. Figures 7B, C)

<u>Circuit Symbol</u>	<u>Item Description</u>	<u>Sorensen Part No.</u>
DS1	See Table 4	
F1 (Line Fuse)	1A 1.5A (SB) 2.5A (SB) 4A (SB)	42-880 42-1559 226-7177P23 226-7177P14
M1 (VM/AM, Dual)	} See Table 4	
R101 (Meter Shunt) thru R104 (Meter Multiplier)		
R105 (Voltage Adjust)	1K (3, 5V) 2.5K, (12, 15V) 4K (24, 28V)	29-562 29-564 29-565
R106, S1, S2	See Table 4	

Table 6A - Common Parts-PM300/PM500 Meter Panels (Figure 6)

Meters

M1	Voltmeter, Multi-Range (0-15/30/60)	587359-1
M2	Ammeter (See Table 6B)	

Resistors

R101	Multiplier, 15K, 1%	586250-145
R102	Multiplier, 30.1K, 1%	586250-185
R103	Meter Shunt (See Table 6B)	
R104	Variable, 50 ohms (Meter Cal)	585348-1

Switch

S101	Output Selector	587443-1
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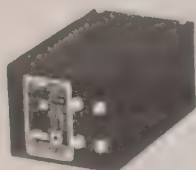
Table 6B-Specific Parts-PM300/PM500 Meter Panels (Figure 6)

<u>Ammeter Rating (A)</u>	<u>(M2) Part Number</u>	<u>(R103) Shunt Part Number</u>
0-0.6	587358-1	587599-4
0-1	587358-2	587599-3
0-2	587358-3	587599-2
0-3	587358-4	587599-1
0-5	587358-5	587560-3
0-10	587358-6	587560-2
0-15	587358-12	587560-1
0-20	587358-7	587559-3
0-30	587358-8	587559-2
0-40	587358-9	587559-1
0-60	587358-10	588151-7
0-80	587358-13	588151-4
0-120	587358-11	588151-6

MODULE MODELS

MODULE I

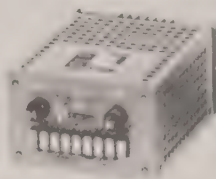
3.313" x 3.875" x 6.5"



QSA

MODULE II

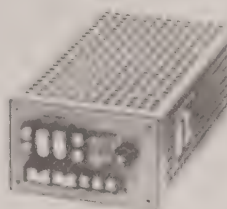
3.313" x 5.125" x 6.5"



PTM

MODULE III

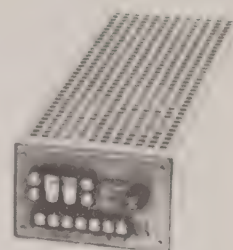
3.313" x 5.125" x 9.5"



STM

MODULE IIIA

3.313" x 5.125" x 14"



STM

PTM 3-4
5-4
12-2.7
15-2.4
24-1.6
28-1.4

QSA 10-1.4
12-1.3
18-1.1
28-.7
48-.4

PTM 12-1D
15-.8D
5/12D1

PTM 3-7
5-7
12-4.4
15-3.5
24-2.3
28-2.0

QSA 10-2.2
12-2.1
18-1.9
28-1.3
48-.8
75-.5

PTM 12-1.6D
15-1.5D
5/12DII

PTM 3-11
5-11
12-6.5
15-5.5
24-4
28-3.5

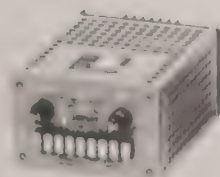
QSA 10-3.7
12-3.8
18-3.0
28-2.0
48-1.2
75-.8
120-.5
175-.25
265-.15

STM 3.5-24
5-24
9-12
12-12
15-10
18-10
24-8.5
28-7
36-4
48-4
PTM 12-3D
15-2.8D
5/12DIII

STM 3.5-36
5-36
9-20
12-20
15-15
18-15
24-13
28-11
36-6
48-6

MODULE IIIB

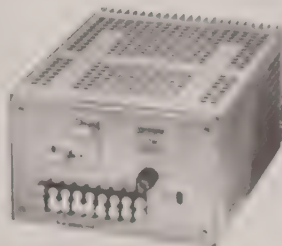
5.125" x 5.125" x 9.5"



PTM

MODULE IVA

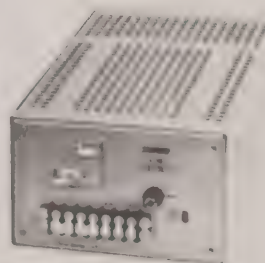
4.938" x 7.5" x 10.5"



STM

MODULE VI

4.938" x 7.5" x 14"



STM

PTM 3-16
5-16
12-10.5
15-9.5
24-6.8
28-6.0

STM 3.5-60
5-60
9-30
12-30
15-24
18-24
24-21
28-18
36-10
48-10

STM 3.5-100
5-100
9-50
12-50
15-32
18-32
24-28
28-24
36-14
48-14

REQUIREMENTS ASSESSMENT AID

Date _____

From:

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____ Tel. No. _____

Please send us your pricing based on the following specifications:

POWER SUPPLY SELECTION

Output No.	Voltage	Current	Sorensen Model	Module Size
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

300 Series

Rack Type: AC-300 ☐
 AC-318 ☐
 AC-320 ☐
 Meter Panels: PM-300 ☐
 PM1 (AC-300 only) ☐
 Blank Panels: PF-300 ☐
 PF-1 ☐
 PF-2 ☐

500 Series

AC-500 ☐
 AC-518 ☐
 AC-520 ☐
 PM-500 ☐
 PM2 (AC-500 only) ☐
 PF-500 ☐
 PF-4 ☐
 PF-5 ☐

Outputs to be metered (Output No.): _____, _____, _____, _____, _____
 (Maximum number limited to 4 for PM1 or PM2. Limited to 5 for PM300 or PM500.)

TYPICAL OPTIONS

	Rack Model	Sorensen Slide Kit No.	
Chassis Slides:	AC-318	587552-1	☐
	AC-320	587552-2	☐
	AC-518	587552-1	☐
	AC-520	587552-2	☐

- On Off circuit breaker for meter panels: PM-300 ☐ PM-500 ☐ (Installed in place of 5th ammeter)
- BITE circuitry (maximum number limited to 5) Output No. _____
- Redundant Outputs: No. _____ & _____ ; _____ & _____
- Front-panel output adjustments on PM-300 & PM-500: ☐
 (Outputs shall correspond to meter position listed above)
- Special output connectors (Specify) _____
- Special panel configurations: (Explain) _____

and for more information...

or to place your name on our active mailing list, please fill out and return the postage-paid card below.

1. My power supply application and operating requirements are:

2. Please send more information on: _____

model (s)

3. My requirements are: ☐ immediate ☐ within 6 months ☐ undetermined

4. Please have a Sorensen Technical Representative call ☐

5. Please place my name on your mailing list to receive all new data ☐

6. Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

First Class Permit
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Manchester, N.H. 03103

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